Summary Report:
New Directions: Reinvention

Workshop 1: Approaches, Tools, and Research Needs for Sector-Based Environmental Protection

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Preface

This *Draft Sector-Based Environmental Protection Workshop Report* summarizes presentations and discussions from the Sector-Based Environmental Protection (SBEP) workshop held June 9 - 10, 1999 in Crystal City, Virginia. The SBEP workshop is part of the U.S. Environmental Protection Agency (EPA) Office of Research and Development (ORD) New Directions initiative. The objective of this initiative is to define new approaches to using science to protect human health and the natural environment.

These new approaches transcend the traditional media or pollutant-based organizational boundaries within the Agency and encompass a variety of disciplines and specialties across offices. To support these new approaches, ORD's Office of Science Policy is hosting a series of workshops between March 1999 and Spring 2000. These workshops provide a forum to present information and discuss issues of interest to the New Directions initiative. The purpose of the SBEP workshop summarized in this report was to enable the exchange of information about the analytical strengths and weaknesses of various SBEP initiatives, to create a network of interested EPA staff, and to discuss the practical considerations necessary to implement SBEP within the Agency.

In a parallel effort, EPA's Office of Reinvention (OR) is currently facilitating development of the *FY2000 Sector Action Plan*. The plan will focus on initiatives within the Agency's core functions that offer new opportunities for using sector-based approaches to environmental protection. Discussions from the SPEB workshop will be considered in the development of the *FY 2000 Sector Action Plan* which is scheduled to be submitted to the EPA Administrator for approval by September 30, 1999.

A variety of EPA offices were represented at the SPEB workshop and a number of presentations were made by Agency staff. In addition, Dr. Bill Glaze, of the University of North Carolina at Chapel Hill, spoke about the need for growing EPA's research capacity and enhancing excellence within the Agency. Dr. Glaze is an emeritus member of EPA's Science Advisory Board which gave him a unique perspective to share with the group. A full list of workshop participants and speakers, as well as their contact information, is contained in Appendix A of this report.

The objectives for the SBEP workshop included:

- Sharing tools and data used in sector-based work
- Discussing science, technical, and analytical issues and opportunities related to sector-based environmental protection
- Creating a network of interested, informed, and experienced EPA staff to integrate sector approaches into EPA's work
- Identifying research, technical, and other needs and opportunities related to sector work

STATUS OF THIS REPORT

The objective of this workshop (or workshop series) was to bring together EPA scientists from the regions, programs, and ORD labs and centers to discuss issues of common interest. The focus of the meeting (or each meeting) was <u>preliminary</u> discussion among scientists and managers from different parts of the Agency, each with their individual and office-specific information and viewpoints.

As a result, it is important to understand that this report summarizes individual and program-specific perspectives. References to <u>pre-existing</u> Agency information and policies should be credited as such, but none of the individual workshop statements or summaries in this report should be credited or cited as Agency information or policies. Rather, this report was developed for EPA use and distributed as a record of the meeting for participants in each meeting, and for EPA's use in planning future meetings and discussion. EPA staff will use information from this report, as appropriate, to design and conduct workshops or other activities for broader discussion both within EPA and with external participation, again as appropriate.

The meeting spanned two days and provided the opportunity for both small group work, in the form of breakout sessions, as well as facilitated, large group discussions. "Poster-walks" were held which allowed the whole group to prioritize the issues that emerged from the individual breakout sessions. Agency presentations were organized around the following topics:

- Problem Identification and Sector Selection
- Sector/Facility Characterization
- Tools for Sector Work
- The SBEP Action Plan
- Integrating Science Into Sector Issues
- Sector-Based Programs

Breakout groups were asked to focus on several pertinent questions. Not all session topics included small group work. Table 1 summarizes the presentation areas for which breakout sessions were conducted and the list of questions people were asked to consider in their breakout groups.

Table 1:
Questions Considered in Breakout Sessions

I. Problem Identification and Sector Selection	II. Sector/Facility Characterization	III. Tools for Sector Work	IV. Experiences in SBEP Implementation
What were the materials of concern? What was the extent of the problem? Why did you choose a sectoral approach to help solve the problem?	What is the general approach being used to characterize the facilities or sector(s)? What analytical model(s), tools, and data were used? What additional research would help the sector/facility characterization?	What is the objective of the tool? How was the tool developed? Does it focus on a single sector or is it broadly applicable? If it focuses on a single sector, how transferable is it to other sectors? From which data sources (if any) does the tool draw? What additional research would improve development of the tool?	What facilitated or enabled SBEP work? What were the obstacles encountered? Might the project have been implemented more effectively in some other way? Why or why not?

After two days of discussing issues and relating experiences with sector-based environmental protection, several major themes were identified, including the need to:

- Define the most significant research needs and focus on building the capacity to perform high-quality research within EPA
- Improve communication about SBEP initiatives, tools, and efforts across offices
- Inventory emerging and currently-available SBEP analytic tools within the Agency to increase the use of these tools and to reduce the possibility of redundant efforts
- Look to outside sources, such as universities and industry, to complement the Agency's databases for information relevant to SBEP work
- Create partnerships that support compliance with existing regulations while enhancing efforts toward cross-media pollution control

The following sections present a summary of the presentations and discussions that occurred during the SBEP workshop. Session summaries are organized around the workshop agenda. This agenda is included as Appendix B of this report. Flip charts from the breakout sessions are transcribed in Appendix C as are the posters used in the poster-walk discussions.

1. Introduction

1.1 New Directions in Environmental Protection (Kevin Teichman, ORD)

Dr. Kevin Teichman of the Office of Research and Development introduced the SBEP workshop. He defined the purpose of the workshop as an opportunity to identify needs and opportunities and to network among, and solve problems across, EPA offices. During his talk, Dr. Teichman contrasted the patchwork quilt of media-specific environmental regulations with the holistic approach to environmental problems offered by SBEP. He highlighted recommendations from the Enterprise for the Environment (E4E): to use economic incentives and information disclosure as a complement to command-and-control mechanisms; to advance monitoring technologies that enable society to focus on environmental performance rather than compliance; and to foster more collaborative efforts among regulators at all levels of government and the regulated. Addressing a room of SBEP practitioners, Dr. Teichman acknowledged that he was "preaching to the choir," but emphasized that the "congregation is listening to the choir" and that ORD welcomes ideas and demand for sector-based work

After Dr. Teichman's presentation, participants observed that:

- It is necessary to look at the entirety of environmental issues faced by an industry and to create holistic solutions rather than media or pollutant-specific solutions.
- The current legal, technical, and organizational setup presents problems because it is media, industry, or pollutant specific.
- The legislative structure from Congress focuses on single contaminants. EPA has to tailor its work to Congress's laws. EPA can encourage and inform the Congress about how to write sector-based laws, but until this happens it will limit what they Agency can do in terms of performing sector-based work.
- It is difficult to try to define the universe of sector-based work, as well as the right boundaries for a given effort.

1.2 Why We Are Here (Jay Benforado, OR)

The Office of Reinvention's Jay Benforado acknowledged the environmental achievements over the past three decades, but argued that EPA's current tools and approaches for environmental protection are no longer sufficient. The environmental landscape has changed:

- Perceived problems have changed; people seem to care about different things, such as "livability," indoor air, habitat preservation.
- Organizations outside EPA, including the states and private firms, have more expertise in dealing with environmental problems.
- New tools are emerging, such as environmental management systems, new emissions monitors, and stakeholder intensive processes.

- EPA's goals have evolved from pollution control to pollution prevention.

The vision for the 21st Century uses innovative solutions to perform environmental protection. The elements of a new sector-based approach include:

- Multi-media rulemaking
- Understanding the environmental, economic, and social issues related to sectors
- Enhancing public access to EPA sector-based specific issues
- Defining EPA structures to support SBEP activities

Sector-based approaches must also take into account the traditional business of the Agency – enforcement and permitting – and must think about the newer approaches to these activities, such as voluntary compliance based on economic incentives and site-specific information.

Discussion following the presentation included observations that sector-based planners ought to think multi-dimensionally. One implication of this is that sector-based programs will need to achieve agreement and participation from all organizational levels of the Agency. Barriers to performing sector-based planning are perceived to exist at the middle manager and staff levels. Agency staff might perceive a disincentive for performing the experimentation necessary to sustain change in terms of the potential to negatively affect performance evaluations under the present structure.

2. Presentations

Presentations were made on the following topics:

- Problem Identification and Sector Selection
- Sector/Facility Characterization
- The Sector-Based Environmental Protection Action Plan
- Integrating Science into Sector Issues
- Sector-Based Programs

2.1 Problem Identification and Sector Selection

Speakers were asked to address the following questions during their presentations:

- What were the materials of concern?
- What was the extent of the problem?
- Why did you choose a sectoral approach to help solve the problem?

2.1.1 Urban Air Toxics Initiatives (Barbara Driscoll, OAQPS)

For the next three years, OAQPS will be engaged in developing air standards on a very tight court-ordered schedule. In addition, the integrated *Urban Air Toxics Strategy* is due for signature June 18, 1999 and will include source-specific standards; national-, regional-, and community-based initiatives to focus on multi-media and cumulative risk; national air toxics assessments; and educational outreach. The goals of the *Strategy* are to:

- Attain a 75% reduction in the incidence of cancer from all Hazardous Air Pollutants (HAPs) and stationary sources in urban areas nationwide

- Attain a substantial reduction in public health risks posed by all HAP emissions from area sources

- Address disproportionate impacts of air toxics hazards across urban areas

The *Strategy* will identify at least 30 new HAP area sources, at least 90% of which will be subject to standards. Much of the HAP information is based on the Toxic Release Inventory (TRI). Using this information, OAQPS is proposing to initially focus on a subset of these 30 pollutant sources in order to address the most serious concerns first.

A sector-based approach is being used to developing these regulations because, depending on the characteristics of the HAP, the risk assessment may include single or multiple pathway assessments and human and ecological endpoints. To do this work, OAQPS is creating models and working intensively to define how to perform risk analysis on mixed sources, such as petroleum refineries. The Agency is hopeful that the models developed for regulating HAPs will be applicable to other endeavors such as the Great Waters project. EPA also intends to promote these models for use by States and regional offices.

2.1.2 PBT Chemicals Use Reductions (Tom Murray, OPPT, Donna Perla, OSW)

The goal of EPA's *Multimedia Strategy on Persistent Bioaccumulative and Toxic Pollutants (PBT) and Mercury Action Plan (MAP)* is to reduce use of these pollutants by linking all of EPA's work on priority PBTs. It is particularly important to address PBTs because they create a problem that crosses media, generation, and national boundaries. For example, PBTs first introduced to the land can later be found in sediments in water. PBTs also endure for long periods of time in the environment and are not as susceptible to natural attenuation as are other substances.

Given the multi-media nature of PBTs, the issue promises significant returns from a sector-based approach. All of EPA's tools from many different programs must be used to stop the transfer of PBTs from one media to another. Additionally, addressing PBTs is a high priority in international debates as these substances move across national boundaries. Reducing the use of PBT chemicals is also high on our own political agenda as evidenced by the Vice-President's Earth Day message.

PBT clean up can only be successful if EPA has a commitment to a multi-media approach and gives top management support. The PBT Strategy is a two-nation strategy complemented by the PBT initiative. The Strategy focuses on the integrated use of Agency tools, a defined set of chemicals, involvement of stakeholders, and objective measurements for assessing impacts. The PBT program spans offices and is involved with:

- The Mercury Action Plan
- The Premanufacturing Notification (PMN) Program
- The *Dioxin Action Plan*
- The Waste Minimization Program as it is focused on PBT

Progress to date includes publication of the Strategy and the MAP draft and current development of national action plans for specific PBTs, such as chlorostyrene. Significant accomplishments include the "Health Care Without Harm" partnership and the reductions in chloroalkali use negotiated with industry.

Subsequent discussion focused on defining the PMN program data sources. Data about new chemicals are rarely supplied by industry, and it would be very difficult to look at each new proposed chemical. Therefore, a sector approach is ideal for this program since defined chemicals, present across media from a variety of sources, can be addressed. EPA intends to use a sector-based approach, among other possible approaches, to deal with PBTs.

2.1.3 Animal Feedlot Operations (Janet Goodwin, OW)

Animal feedlots are subject to permit regulation as a point source. Animal feedlot operations raise several concerns, such as bacterial and viral infection, and eutrophication from animal wastes entering waters from runoff or through intentional release. Breaches in a poultry waste lagoon have resulted in *pfiesteria* outbreaks in the Pocomoke River, for example, so the extent of concern is significant. Additionally, the Clean Water Act identifies animal feedlots as a primary contributor to water quality impairment.

The Office of Water (OW) is using a sector approach to animal feedlots because the wastes impact both land and water. The traditional disposal method of spreading wastes on agricultural fields is being compromised by the fact that the size of feedlots has increased disproportionately to the acreage available for waste disposal.

Discussion after the presentation centered on science issues and the use of Best Available Technologies (BAT) to achieve controls in the industry. Future guidelines will probably not set limits, but instead will require BAT to be focused on better containment practices. Guidance will also be given about how and when manure can be applied to the land. Science issues involved in this sector include obtaining the data to characterize this industry. United States Department of Agriculture (USDA) data have been used, but OW is finding that there is a paucity of relevant data, particularly concerning poultry manure.

Participants observed that an overarching science issue across sectors includes selection of different chemicals and introducing pollution prevention initiatives into the sector process by having enough data to see the pollution prevention opportunities. Because of the time pressure on the development of effluent guidelines, sector-based approaches are particularly relevant. However, without having time or resources to fully gather the data, OW will have to rely in part on educated assumptions.

2.2. Sector/Facility Characterization

During presentations relating to sector/facility characterization, speakers were asked to address the following questions:

- What is the general approach being used to characterize the facilities or sector(s)?
- What analytical model(s), tools, and data were used?
- What additional research would help the sector/facility characterization?

2.2.1 Risk-Screening Environmental Indicators Model (Steve Hassur, Nick Bouwes, OPPT)

This presentation was based on a slide show and screen tour of the Risk-Screening Environmental Indicators (RSEI) software model available internally to EPA (the “air-only version” with 1988-1997 TRI data has now been released to the public). Development of an Acute Human Health Indicator and a Chronic Ecological Indicator is also planned.

Drs. Hassur and Bouwes contrasted the results that one would derive if one were to prioritize the top pollutants recorded within the TRI database by weight versus a prioritization based on risk. Risk measurements are based on calculations of release data and exposure modeling. RSEI offers a screening-level, risk-related perspective for relative comparisons of chemical releases. The RSEI model can be used for targeting, trend analysis, and screening. It has undergone extensive scientific review and the next generation of the model is now under development. This next generation model will allow the user to create a prototype facility and will permit the use of other databases in addition to the TRI.

Discussion following the presentation centered on the issue of data validation. A member of the audience posited that because the TRI captures only about 10% of actual releases, a risk assessment based solely on this data might not be complete. The presenters stated that this was a concern and the next-generation of the CHHI model will be able to use additional data sources for risk assessment. Data in the present model were verified by comparing them to data from the state of New York; this comparison yielded a close match.

2.2.2 Sector/Facility Indexing Project (Rob Lischinsky, OECA)

This presentation was based on a handout and Internet tour of the Sector/Facility Indexing Project (SFIP) web site at: http://www.epa.gov/oeca/sfi. The web site is the result of a five-year effort by the Office of Compliance (OC) and has had 50,000 user sessions recorded in the year that it has been on the World Wide Web.

SFIP presents data on 640 facilities in five industrial sectors. SFIP data comes from a variety of media-specific databases. It covers inspections per facility, enforcement actions, and chemical releases and spills. SFIP also presents facility background data, such as area demographics. The data are refreshed quarterly. Users can construct queries to obtain information of interest – for example, to compare the environmental performance of two competing steel companies. SFIP can also be used to perform sector analysis work because it allows the comparison of a given facility with any other in the nation. It further allows comparisons of environmental performance and trends across industries.

2.3 Sector-Based Environmental Protection Action Plan (Greg Ondich, OR)

The current draft of the *Sector-Based Environmental Protection Action Plan* (SBEP Action Plan or the Plan) is posted on EPA's web site at: http://www.epa.gov/sectors. Under the direction of new Office Director Rick Ferrell, OR is now in the process of completing a two-year transition plan from the Common Sense Initiative (CSI) to the SBEP Action Plan. To capture lessons learned and evaluate the success of the CSI, a four-year CSI evaluation has been commissioned.

Appendix A of the Plan presents a comprehensive definition of sectors and the value of sector approaches to environmental protection. The Plan also presents the range of software models available for performing SBEP analyses. The Management Approaches section of the Plan is particularly useful. This section summarizes the offices and organizations that will implement the goals of the Plan and considers and involves every level of the Agency. The Plan specifically details 35 activities to be implemented Agency-wide. Table 1 of the Plan presents these 35 activities and is updated monthly on-line to keep progress information current.

The Innovation Task Force Report also stated that sectors are a cross-cutting area. The report covered:

- Performance tracking
- Creation of incentives
- Compliance assistance, e.g., using flexible permitting when appropriate
- Delivery improvement, i.e., integrating rules as they are being developed
- Enhancing community awareness

Program initiatives implemented within the core functions of the Agency during 1999 will be detailed in the FY 2000 SBEP Action Plan. Current work involves building management capacity and creating work plans. Workshop participants are invited to contribute to the formation of these workplans by joining the SBEP Action Plan work group in which sector-based solutions will be crafted.

Workshop participants raised the issue of EPA Office of General Council (OGC) resistance to flexible permitting. It was pointed out that OGC is represented on two of the four cross-media pollution prevention permitting committees. This enables OGC to be part of the flexible permitting process from the beginning. Participants also questioned the level of Agency commitment to sector-based initiatives. OR itself is devoting at least three and one-half full-time employees (FTEs) to sector initiatives.

2.4 Day One Observations

At the beginning of Day 2 of the SBEP workshop, the ORD lead, Pasky Pascual, offered his observations based on discussions held the previous day:

- There exists a preponderance of tools that focus on human versus ecological health. There is a great deal of data about the effects of toxics on humans but not enough on the effects of pollutants on biological systems, especially not on the cross-media level where sector planning takes place.

- One needs to distinguish between algorithm and data issues. One needs to distinguish between problems that lie with a particular model's assumptions or methodology and problems that arise because of faulty data or a lack of data.

2.5 Integrating Science into Sector Issues (Dr. William Glaze, University of North Carolina at Chapel Hill and the Science Advisory Board)

Dr. Glaze complimented EPA scientists for their many achievements in the face of limited resources and spoke on the need to increase research capability within EPA and to insist on a higher level of scientific excellence. Dr. Glaze cited the example of EPA's reaction to recent *pfiesteria* outbreaks. The ability to correlate the fish kills with hog farm wastes is not based on a large amount of credible scientific data. Furthermore, risk models are inadequate and fundamentally problematic in determining ecological risk.

If the Agency does not have credible models or there are fundamental problems within the existing models, then the level of uncertainty should be clearly communicated. From Dr. Glaze's perspective, there has not been a cross-organizational effort, thus far, to collect, organize, and make data available to all parts of the Agency. Additionally, alternative sources of data could possibly come through more interested citizen involvement and through more student involvement at the graduate-school level.

To be useful for sector work, models have to incorporate multi-media information. Using these models, good decisions have to be made about targeting compounds on which to focus Agency efforts. The choice of what to monitor is an important one. Currently, EPA focuses on a small population of compounds leading to questions about what substances are being overlooked. The history of the environmental movement has been driven by surprises due to ignorance about compounds and pollutant effects.

The Agency is also not currently using the best modeling tools. Biology must be included in models and must integrate the eco-toxic effects. Current models do not demonstrate an understanding of what happens biologically when chemicals move across media. The Agency must recognize these science gaps. With data gaps come increased uncertainty. The level of uncertainty must be communicated. Workshop participants are urged to support the development of an EPA science establishment on par with to the National Institutes of Health. The Science Advisory Board is also an important resource available to EPA to provide advice on whether to invest in research and to provide advice on where the scientific bases for new approaches need to be strengthened.

Dr. Blaze highlighted other opportunities for research, including: developing methods and collecting data to enable facilities to make trade-offs of risk; improving monitoring technologies, including monitoring of biological and ecological impacts; improving information on exposure to pollutants. Dr. Blaze urged EPA to learn from Europe in the areas of recycling and lifecycle management.

Discussion further identified that biological models need molecular and cellular data. Because of the lack of economic incentives, ecological research at this level will not be done unless the government does it. Workshop participants also observed that data gathering exists on a continuum. This is evidenced by the fact that once a decision gets made data gathering stops. This suggests that data gathering may be too closely linked to politics.

Participants also noted that the EPA needs to intensify research and development efforts. The Agency has to make efforts to minimize uncertainty to the extent possible, to improve efforts to access data from many sources, and to form partnerships with other research organizations. The Agency can provide incentives for university researchers to share raw data through cooperative agreements.

2.6 Sector-Based Programs

2.6.1 Sustainable Industry Program (Bob Benson, OP)

The Sustainable Industry Program (SIP) is a tool that exists to leverage behavior and to influence day-to-day production decisions in industry. When looking at an industry, the question for SIP is how do we tailor our programs for the specific needs of a sector? The SIP analysis defines multiple drivers, or forces, which will motivate an industry or company to change its practices to become more environmentally sustainable. Common drivers include compliance pressures, economic incentives, and public perception. After defining several drivers, the SIP will then focus on the most critical.

SIP takes a systematic approach to sector development and analyzes industry traits and trends. The advantage of the SIP sector approach is that it brings industry into the compliance process. Industry has valuable ideas to enhance environmental sustainability that can be used and leveraged in other situations. To provide perspective on the value of SIP, this approach was compared to a method used in a CSI program. In a CSI program targeted to the metal finishing industry, all entities performing related research were brought together to present findings to a group of metal finishers. It was hoped that these research results would help move metal finishers to an increased level of compliance. Instead, at the end of the presentation of research results, the metal finishers did not find the information to be relevant to their problems.

EPA chose to readdress the needs of this industry though the SIP. Today, the metal finishing industry is an example of how far a sector can go under the program. Nationally, this sector has volunteered to set environmental goals beyond basic levels of regulatory compliance. Although the industry recognizes there is a need to increase the amount of research conducted, they point out that the regulator has an obligation to understand the needs of the industry and how they are currently being met. Other sectors can look to the metal finishing model as an example of what a successful SIP can achieve.

Group discussion centered on defining drivers. One important aspect of the SIP is to define as many drivers as possible; in some cases, as many as 50 or more drivers might be identified. Once these drivers are defined, the SIP focuses on only a critical few. To achieve industry buy-in on the drivers selected, as well as to determine whether they can be used to leverage industry behavior, the SIP approach calls for the Agency to meet with the industry early in the regulatory process. This initial contact will help EPA understand the industry's needs and to gain some agreement about possible approaches to achieving both parties' goals. Once these issues have been laid out and understood, the Agency will work internally to gain the support of all involved EPA offices.

2.6.2 Design for the Environment Program (Bill Hansen, OPPT)

The Design for the Environment (DfE) Program works with industry to design products, processes, and technologies with environmental protection and market competiveness in mind. The DfE approach is grounded in comparing risk, performance, and cost of alternative technologies. DfE seeks to shift the focus from pollution control to pollution prevention by encouraging front-end innovations through redesign of formulations, shop floor processes, disposal practices, or management practices. DfE develops a strong collaborative relationship with an industrial sector, often made up of many small businesses. Many small businesses recognize DfE as their primary source of reliable health hazard and environmental information which allows them to make environmentally preferable choices. DfE has worked in partnership with such industries as printers, dry cleaners, autobody shops, adhesive manufactures, electronic components manufacturers, and automotive parts suppliers.

DfE is a solution-based risk management program that recognizes that lasting change must balance business practicalities with sound environmental decision-making. DfE engages in customized, collaborative, consensus-building, voluntary partnerships. DfE partners with an entire industry through industry leaders, trade association representatives, academia, and government. DfE performs a comparative risk analysis on existing and substitute technologies and promotes the use of chemicals an processes that are less toxic, less persistent, and non-bioaccumulative. DfE has assessed over 500 chemical substances. This program results in decision-making that provides positive impacts from both a multi-media and an industry perspective.

DfE is applicable to SBEP because it is sector-based program. A sector focus provides for the wide-spread dissemination of DfE risk assessments throughout an industry. DfE also serves to address regulatory gaps for many chemicals, used by industry partners, which pose a significant or substantial threat of hazard to workers, communities, or to the environment.

2.6.3 Sector-Based Enforcement and Compliance Assurance Programs: Overview of National Sector Analysis (Bob Tolpa and Michael Barrette, OECA)

The sector focus of this program deals with the chemical, coal-fired, iron, steel, oil refinery, and non-ferrous metals industries. These industries were selected based on their potential for harm. The program's mission is to enhance compliance with existing laws. The sector approach is performed by evaluating compliance rates within a sector and identifying compliance problems, such as chronic leaks in petroleum refining equipment. Although sector work provides OECA the opportunity to share ideas within the Agency, compliance enforcement is still a big pollution control driver and is second only to cost savings. The importance of sending the message that compliance will be enforced should not be overlooked.

Discussion following the presentation focused on compliance assistance and the cause of noncompliance. Participants observed that there is missed opportunity when offices do not coordinate. For example, DfE could offer compliance assistance to poor performers targeted by OECA and EPA or could offer incentive programs, as in the case of PBT efforts with mercury. However, EPA's enforcement program does not conduct root-cause analysis of compliance problems, which is necessary for the Agency to offer compliance assistance. Industry wants to be given flexibility as a result of partnering with EPA, but it must still demonstrate compliance with its existing permits. OECA will continue to enforce regulatory compliance.

3. Breakout Session and Poster Walk Summaries

3.1. Tools for Sector Work

Breakout group work was structured based on the following questions:

- What is the objective of the tool?
- How was the tool developed?
- Does it focus on a single sector or is it broadly applicable?
- If it focuses on a single sector, how transferable is it to other sectors?
- From which data sources (if any) does the tool draw?
- What additional research would improve development of the tool?

3.1.1 Sector Audits and Profiles

Self-Audit and Inspection Guide (CD-ROM) for Organic Coating Facilities (Anthony Raia, OECA)

The EPA Office of Enforcement and Compliance Assurance (OECA) worked with the National Defense Center for Environmental Excellence to develop a unique and innovative compliance assistance tool. The tool uses state-of-the-art information technology to provide regulatory and technical information to EPA and State inspectors, technical assistance providers, and industry personnel. This tool, entitled the "Self-Audit and Inspection Guide for Facilities Conducting Cleaning, Preparation, and Organic Coating of Metal Parts," consists of a CD-ROM and accompanying written guidance. Anecdotal evidence suggests wide applicability and use of the tool; more than 400 copies have been requested.

The CD-ROM places users at a virtual control panel from which they can navigate a tour through an organic coating facility using video and animation. It provides a video or animated presentation and a narrated description of 17 metal parts cleaning, coating, and curing processes with Internet hot links to additional resources. In addition, materials for each process area include: (1) summaries of the applicable Federal environmental statutes and regulatory requirements; (2) Internet hot links to the full text of Federal environmental statutes and regulatory requirements; (3) self audit and inspection questions; (4) sources of pollution; (5) common causes of violations; and (6) pollution prevention alternatives.

The tool would benefit from additional research conducted on pollution prevention alternatives for the surface preparation and organic coating industry. Since pollution prevention alternatives are constantly improving, it would be helpful if these sections on the CD-ROM were linked to an Internet site which could be updated frequently. In addition, including audit protocols would be invaluable.

EPA's Environmental Audit Protocols (Richard Satterfield, OECA)

The EPA Environmental Audit Protocols project was initiated by the Office of Enforcement and Compliance Assurance (OECA) in 1998. The project was created to develop 13 multi-media protocols to complement EPA's audit policy and priorities set in Memoranda of Agreement (MOAs). These protocols were intended to assist the regulated community in conducting audits and complying with applicable environmental regulations. To date, four protocols have been produced and are available to the public. These include: Resource Conservation and Recovery Act (RCRA) hazardous waste generators, RCRA Treatment, Storage, and Disposal Facilities (TSDFs), Emergency Planning and Community Right to Know Act (EPCRA), and Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) protocols. Nine more protocols are expected in 1999: nonhazardous waste management, universal waste and used oil, pesticides management, toxic substance management, Safe Drinking Water Act, Spill Prevention Control and Countermeasure (SPCC) requirements and Storage Tank Management, Clean Air Act, Clean Water Act, and Toxic Substances Control Act (TSCA).

Each protocol includes: (1) key requirements under the relevant statutes, (2) regulatory terms and definitions, (3) an overview of the Federal laws affecting a particular environmental management area, and (4) a regulatory checklist containing detailed performance objectives for auditors. The protocols are designed to be user friendly. Each protocol receives a full review by EPA regulatory experts in Headquarters and the Regions prior to publication and distribution. They are made as generic as possible to serve multiple needs. Copies of the protocols are available in hard copy from EPA's National Service Center for Environmental Publications (NSCEP) or electronically via EPA's website at http://www.epa.gov/oeca/ccsmd/profile.html. Users are encouraged to download the protocols, available in pdf and MS Word formats, and tailor them for use under their own site-specific environmental conditions.

Through this project, EPA intends to encourage businesses and organizations to perform environmental audits in a thorough and comprehensive manner and to disclose violations in accordance with EPA's Audit Policy. In response to stakeholders and State partners who have requested audit checklists, these protocols provide the tools for performing audits and meet EPA's obligations for providing compliance assistance. Specifically, this project corresponds to Goal No. 9 of EPA's Strategic Plan, which states that "EPA will ensure full compliance with the laws intended to protect human health and the environment" and that EPA will "promote the regulated community's voluntary compliance with environmental requirements through compliance incentives and assistance programs."

The program has already proven successful. Since December 1998, EPA has responded to more than 1,500 requests for the EPCRA protocol, 1,500 requests for the CERCLA protocol, 1,850 requests for the RCRA generator protocol, and 1,900 requests for the RCRA TSDF protocols. EPA Regions have found the protocols useful in training inspectors.

In the future, EPA will develop virtual audit tours for the Compliance Assistance Centers and correlate checklist items to site activities and processes. Audit Protocol Application Guides, which match checklists and environmental management and safety considerations to site activities, will be created. Finally, EPA will modify a prototype checklist to support EPA Regions in improving the training of inspectors.

Sector Profile Tool (Fred Talcott, OP)

Sector profiles are currently in development by the Emerging Strategies Division of the Office of Policy Development. A sector profile is a data, text, and graphical portrait of an industrial or other sector of the economy of some environmental interest. It contains at least the following basic elements: (1) sector demographics and economic characteristics; (2) a description of the processes; (3) inputs, such as raw materials, capital, labor, and energy; (4) outputs, including products and environmental residues/pollutants; (5) the regulatory situation and other governmental involvement; and (6) issues and opportunities.

The profile is structured to include three sub-profiles. The data resource profile includes the original data resources in print and electronic formats. It also includes spreadsheets and database files that were extracted from the original data, as well as indices and other means to organize and extract information. In some cases, a PC-based means to probe the data is developed. The detailed data profile consists of approximately 30 pages of text and graphics. Finally, the presentation profile includes an MS-PowerPoint or similar set of slide presentation materials.

A useful sector profile covers these basic elements and provides concise, current, and accurate information that is easily updated, extended, and corrected. The profile should be flexible, allowing for different types of displays for different audiences as well as different types of insights for different policy issues. It should be economical to produce and provide information quickly and easily. The profile is intended to permit a range of uses by EPA and others. It can provide background for regulatory and other traditional EPA activities, provide input for other policy actions, and serve as an aid for locating potential problems. The profile allows EPA to determine which problems require resolution and which solutions are possible, given the characteristics of the sector.

To encourage creative approaches, the sector profile tools are being developed in an atmosphere of friendly competition. The petroleum refining, iron and steel, and food processing sectors have been divided among one EPA and two contractor teams. While each profile focuses on a single sector, the approach is designed to be generally applicable. Each profile team has found data specific to its sector as well as data sources of widespread usefulness. Each team will prepare its sector profile over a three-month period according to a basic outline, although innovations are encouraged. The best aspects of the three will be used in future profiles. For example, one team has developed a computerized system to integrate underlying data, spreadsheets, and graphical outputs, which may serve as a potential template for other sector profiles.

Profile data sources are numerous and include the Bureau of the Census (particularly the Census of Manufactures and Annual Survey of Manufactures), the Energy Information Agency, the United States Geologic Survey, the Department of Agriculture, and other Federal agencies. The trade press is also a useful source of data. Existing EPA data sources are also used, including the Toxic Release Inventory (TRI), Permit Compliance System (PCS) for National Pollutant Discharge Elimination System (NPDES) permits, Aerometric Information Retrieval System (AIRS), and RCRA Biennial databases.

While at least basic data have been found for all elements of the profile, many areas remain only thinly covered. For example, it is difficult to make comparisons at the level of the four-digit SIC code or below. Data quality is also a concern. While the availability of information through CD-ROM and over the Internet has improved in recent years, some items remain available only in hard copy and therefore pose problems with regard to data accessability. Data handling also remains a problem.. Creation of text, graphics, and a profile database in MS-Access has been a successful, although time-intensive, process. EPA is considering ways of making the process semi-automatic for future profiles.

EPA is also considering using the profiles in efforts to include flexibility in policy issues. EPA explored the development of “Eco-efficiency Benchmarks” for sectors so that facilities and firms could compare their performance to that of their peers. The Agency found that useful measures exist across years or sub-sectors, such as sales or value added. However, only three of seven components have sufficient data to create a facility-specific presentation. These are material intensity, energy intensity, and toxics dispersion. Data on recycling, sustainable use of renewable resources, durability of products, and service intensity are not complete.

Metal Finishing Facility Risk Screening Tool (Matthew Lorber, ORD)

In its *National Metal Finishing Environmental Research and Development Plan*, the EPA Common Sense Initiative’s Metal Finishing Sector group identified principle needs for the sector. One priority was the development of procedures and tools to characterize risks to workers and neighbors of metal finishing facilities. In response, EPA published a primer on risk assessment specific to this sector, entitled *Characterizing Risk at Metal Finishing Facilities* (EPA 600-R-97-111). The primer describes the approach taken by EPA to evaluate exposure and human health risks to contaminants in the environment and how that approach can be applied to the metal finishing industry. The Agency also began development of the Metal Finishing Facility Risk Screening Tool (MFFRST).

MFFRST is a user-friendly computer tool, which allows users to evaluate the potential exposures and health risks to workers and nearby residents from emissions from individual metal finishing facilities. Emissions to air, including emissions from stacks to the outdoor environment as well as fugitive emissions from indoor sources, during routine operations are considered. No other waste streams, such as water or sludge disposal, or accidental emissions have been considered to date. The tool evaluates exposures through inhalation only and does not consider dermal contact, soil impacts from deposition, or food chain impacts.

MFFRST is a screening tool. As such, it has been designed with a user-friendly computer interface. Data needs are designed to be manageable and sufficient guidance for all model parameters are provided in either the accompanying documentation or attached databases. Finally, the results are purposefully conservative so that the user can feel confident that assessments showing insignificant potential human health risks are true. On the other hand, if the results suggest a potential concern, users should undertake additional assessment efforts, such as the refinement of assumptions in using MFFRST, the use of more refined and sophisticated modeling, monitoring to evaluate actual air concentrations, or other measures.

A beta test version of MFFRST is currently available for review and comment. Over the next year, EPA will refine the model and finalize documentation. Once completed, the success of and demand for the model will be evaluated. Further efforts may focus on expansion of similar tools into other waste streams, model validation, and routine application of the model in regulatory and similar arenas.

3.1.2 Advanced Monitoring Technologies - Leak Detection and Remote Sensing

Environmental regulations often require the implementation of monitoring programs on the part of affected industries and EPA. However, for some sectors, existing monitoring technologies are prohibitively expensive and cumbersome. This breakout group looked at two new remote sensing monitoring technologies - one for use in industry, particularly in the petroleum sector, and the other for use by EPA in identifying abandoned industrial sites. The following points summarize the research needs for advanced monitoring technologies. Discussions about specific technologies are detailed below.

- Improve technology for use in air emissions identification and quantification
- Extend coverage of spectral fingerprints
- Increase research in water chemistry and vegetation sensing to facilitate sampling and understanding ambient conditions
- In addition to using tools for identification, increase their ability to characterize and quantify the data collected
- Capture uncertainties and determine the limitations of technology
- Move from data collection to analysis

Leak Detection and Repair (LDAR) System

Steve Souders, with the EPA Office of Solid Waste Common Sense Initiative, presented the Equipment Leaks Project, which evaluated smart LDAR systems. The objective of the project was to develop LDAR programs for petroleum refineries that are cleaner, cheaper, and smarter than existing technologies for identifying fugitive emissions, such as Volatile Organic Chemicals (VOCs).

Monitoring for fugitive emissions is required quarterly for most plants, although some are allowed to test twice per year. The current monitoring practice for fugitive emissions is Method 21, which requires the individual measurement of many components using a hand-held vapor analyzer. This method is time and staff intensive and results in identifying only a few leaks over a great many measurements. It is estimated that monitoring costs approximately $1 million per year for a single refinery based on a cost of $ 0.40 to $2.00 to measure each individual component. One way of increasing efficiency and decreasing cost would be to target monitoring on those parts which have the greatest potential for leaks.

The American Petroleum Institute estimates that 84% of emissions come from only 0.13% of components. However, in a study performed by ICF Kaiser, leaks were found to occur randomly; and no components could be identified as chronic leakers. In light of this finding, EPA began looking at alternative monitoring technologies, such as remote sensing and imaging systems.

The Backscatter Absorption Gas Imaging (BAGI) System

The BAGI system appears to be the most promising technology at this time. It uses the Periodically Poled Lithium Nicobate (PPLN) laser, developed by Sandia Laboratories, in conjunction with the Laser Imaging Systems GasVue technology. When a leak occurs, the gas cloud absorbs the laser light passing through it. When this light reaches the detector, an image of the gas plume is produced, though BAGI does not currently quantify the leak. The BAGI unit can be as far as 30 meters from the source to the monitor. It will image any VOC; however, a goal is to develop a tool which will be able to discriminate between different types of VOCs. While EPA standards define a leak as anything over 10,000 parts per million (ppm), the BAGI system is most sensitive to leaks over 100,000 ppm, and the lower limit of detection ranges between 25,000 ppm and 50,000 ppm. Estimated unit cost is $150,000. The BAGI technology still needs to be made safer and more portable. Once the tool is made small enough to be carried by one person, it should require less time to perform monitoring.

A more portable version of BAGI has completed preliminary testing. A pilot test of the portable tool will be conducted in the fall. Preliminary testing with a tool portable by truck was conducted in April 1999 at a petroleum refinery. BAGI system performance was compared with an evaluation by the Method 21 team. The Method 21 team measured 1,464 components (primarily valves and pump seals) over a period of two to three days. The BAGI team observed about 6,600 components of all types and followed up leak discoveries using an organic vapor analyzer to take measurements. The leaks discovered using the BAGI system were videotaped, which is a distinct advantage over Method 21. Both teams tested seven process areas.

The BAGI system identified high leakers above 100,000 ppm in three process areas, including a high leak in a heat exchanger that would not have been examined under Method 21. Some leaks found by the Method 21 team that were around 30,000 ppm were missed by the BAGI system. Variability in detection limits may be due to line of sight, distance to leak, subjectivity of image interpretation, and types of hydrocarbons leaked. The background reflective surface may also be a factor. BAGI detected only 12% of the leaks from propane bullets, probably because the silver or white bullets caused reflectivity problems with the laser light source. Steam plumes appear similar to hydrocarbon plumes and may in fact obscure a hydrocarbon plume. Wind speed and direction are a concern because the gas plume must move in order to be seen; on the other hand, dispersion cannot be too fast.

In summary, the team using Method 21 was able to measure about 85 components per hour per person, monitoring at arms' length only and without climbing. In a detailed test, the BAGI system measured an average of 600 components per hour, with a range of 250-4000 feet. With user experience, efficiency will improve. The best performance for the BAGI system was obtained in an open area with many closely-spaced, unobstructed components. The BAGI system was also tested under rapid "drive-by" conditions. When mounted on a van and driven at 5-10 miles per hour, the system easily identified a high leaker, but had difficulty seeing small leaks. Approximately 200 components per minute were evaluated in this way.

Next steps for this project include further development and laboratory and refinery tests of a portable prototype for improved accessibility. Regulatory changes required for the application of the technology would have to be approved; this process might take two years. During this time, the BAGI technology could be readied for widespread commercial use.

Hyperspectral Imaging - Airborne Visible Infrared Imaging Spectrometry (AVIRIS) System.

Ken Wangerud and Tony Selle from EPA Region 8 presented the AVIRIS system. This tool provides a screening-level evaluation of Abandoned Mine Land (AML) areas to support subsequent evaluation of watersheds contaminated with multiple sources of mining-related waste. The remote sensing hyperspectral imaging tool is intended for use in identifying, measuring, mapping, and monitoring the effects of mine waste releases on watersheds and other aquatic environments.

An estimated 200,000 abandoned mining and refinery sites exist in the West; there are 21 National Priorities List (NPL) sites under this sector in the East. There are approximately 90,000 abandoned sites in watersheds where EPA does not have information on the independent and collective effects on the environment. Traditionally, the environmental industry used costly and time-consuming multi-media sampling and extensive analysis to evaluate the nature and extent of contamination in these watersheds. The use of hyperspectral imaging and analysis as an initial screening tool would decrease the number of sampling teams needed in the field.

The AVIRIS system has been reduced from the size of a small car to the size of a coffee can. It is flown at high altitude (70,000 feet) in a civilian U2 airplane. Flown at midday on clear days, the device uses reflected solar emissions as a source of energy. AVIRIS was tested in Utah over eight major mining sites. One and a half million acres were surveyed in 6.5 hours of flying time for a cost of approximately $3.50 per acre for data acquisition. Resulting data were analyzed over a six-month period. It is anticipated that satellites fitted with spectrometers flying in low earth orbit will be able to provide data every 36 hours for an 8-meter pixel.

AVIRIS can only monitor the surface; its ability to penetrate water is limited to only a few centimeters and it does not penetrate the vegetative canopy. Because of this limitation, AVIRIS is most effective in the West. However, because it can detect bare ground as small as one square meter, AVIRIS can be used to identify dumps of waste rock in the East. To be detected, a mineral must comprise at least 10% of the area within a pixel, but it need not dominate. Indicator compounds are shown and ranked for severity. Buffer compounds are also shown and enable the analyst to determine if enough of a buffer exists to counter the leachate in the watershed and, therefore, lower the cleanup priority ranking.

AVIRIS is most useful as a screening tool to show the best locations for field assessment to track chemical plumes from sites into water. It gives EPA the capability to better prioritize and strategize its use of sampling teams, saving the time and money otherwise required to send a team to each watershed. Other uses of the technology include mineralogy, mineral exploration, and vegetative mapping.

EPA has also invited private companies to test similar tools, including the SWIR Full Spectrum Imager (SFSI), designed and constructed by the Canada Centre for Remote Sensing. This tool was modified by Borstad Associates Ltd. for commercial operations and is available for remote sensing surveys worldwide.

Research Needs

Research needs for these tools are similar. For example, the coverage of the spectral fingerprints should be extended. Each tool should be investigated for other types of applications. The LDAR tool could potentially be used for identifying analytes in air pollution and the quantifying air emissions. Some sensors already exist for air emissions, but users in other fields need to be educated about the additional capabilities of remote sensing. These capabilities can also be expanded to quantify impacts as well as identify sources of pollution. Some sensors now in development are looking at water chemistry and vegetation impacts, for example.

Currently, private sector tool developers seem reluctant to devote research dollars to develop this technology for fear that a sufficient market for these tools does not exist. EPA ORD should collaborate with the Bureau of Land Management, the Forest Service, and other agencies that could benefit from the tools to leverage EPA resources and encourage tool development. Once developed, the pictures and maps that these tools provide can be used to show companies their compliance problems and serve as an incentive to motivate problem resolution. However, the uncertainties of the tools must be identified and addressed.

In summary, transferability of remote sensing technologies is important; it is vital to modify the LDAR tool for use outside of a refinery setting. In addition, EPA should move away from industry monitoring to establish compliance with regulations and towards improving industry performance. At the same time, it is important to capture uncertainties and to remember that simply having data does not allow EPA to make conclusions about a watershed or other problem area. The data must be analyzed and synthesized correctly. Finally, in encouraging use of these tools outside the Agency, it should be emphasized that remote sensing technology is less expensive and often safer than the human field teams it replaces.

3.1.3 Design For the Environment (DfE) Tools

A variety of sector-based software tools was presented, five of which received the most interest among participants. These included:

- Use Cluster Scoring System (UCSS)
- ChemSteer
- Environmental Fate Assessment Screening Tool (E-Fast)
- Graphical Exposure Modeling System (GEMS)

- Source Ranking Database (SRD)

Use Cluster Scoring System (UCSS)

UCSS is a PC-based model that organizes chemicals into clusters, or groups, to define chemical substitutes. Groupings are according to use, including characteristics such as toxicity and persistence. The tool takes into account several areas of data including human hazard, human exposure, ecological hazard, and ecological exposure. A cluster score is determined for each chemical group. These cluster scores are determined by averaging the individual scores for each chemical in the cluster. A score is determined by human hazard multiplied by human exposure plus ecological hazard multiplied by ecological exposure.

The UCSS method can facilitate SBEP due to the amount of data in this system. The system contains information on 3,700 chemicals and contains 390 use clusters. The capabilities of this tool have stretched beyond the ability to glimpse the type and use of a specific chemical to the ability to prioritize sectors based upon the chemicals used (i.e. toxicity to workers and the environment).

UCSS can also prioritize the cluster based on wastes, with the focus on quantity and type of waste. This tool provides an opportunity to answer questions such as, are all chemicals in a given product toxic and, if not, what percentages are found to be so? The UCSS method is data rich but extends over a very broad arena. A limitation of this method is that it tends to focus more on the active ingredients in a product, rather than impurities, or by-products.

Research Needs

A difficulty many found in dealing with this tool revolved around the identification of the clusters. In addition, the group felt that a more cost–effective approach to using this tool would improve its applicability. This method was considered to have potential use in sector work if a technique could be found in which unintended by-products were accounted for. It was also noted that a greater range of links to chemical formulations and uses could increase the applicability of the UCSS method, as well.

ChemSteer

ChemSTEER, the Chemical Screening Tool for Exposures and Environmental Releases, has strong sector-based applications. This software tool estimates worker exposure and releases to air, water, and land for a chemical. This software will contain “generic use scenarios” for over 50 specific industry sectors and chemical functional uses that have been developed based on industry sector- and use-specific data and information. Advantages of the ChemSTEER method include the low amount of information input needed, particularly for non-chemical manufacturing sectors, and the dermal and inhalation exposure parameters and models. Required input data and information includes chemical volume, use, molecular weight, and vapor pressure. Some optional parameters include numbers of sites and workers for sector and use scenarios. Presently, the ChemSTEER software is in a de-bugging phase with demonstration-phase completion expected by the end of 1999.

Research Needs

ChemSTEER would benefit from further research and development of data for many of the industry sectors, which will fill data gaps and bolster the quality of the data used for calculations. The inclusion of organizations, such as trade associations, as a key source of data and of peer review will also improve the quality of this tool. Improving the user-friendliness of ChemSTEER will facilitate its use by potential customers, which include industry, academia, and governmental and non-governmental organizations.

Environmental Fate Assessment Screening Tool (E-Fast)

E-Fast is a software tool that models toxic exposure scenarios for target groups, including exposure and risks to both humans and aquatic life. E-Fast gives the user the capability to input factors such as toxic substance, group affected, and exposure pathway to calculate exposure models. The pollution exposure pathways included in E-Fast modeling are contaminated water, dermal contact, inhalation, ingestion, and industrial releases.

E-Fast is a refined, efficient, user-friendly model designed to minimize the amount of data-entry required of the user. For target groups, E-Fast can factor in race and age, and estimate exposures tailored for different toxic endpoints. E-Fast can be useful in a sector-based approach due to the industry-specific nature of the model. E-Fast presently includes 35–40 sector scenarios or models that were developed using “real world” facility data incorporated by SIC codes.

E-Fast can analyze a pollutant’s pathway beginning at the manufacturer and ending in an individual watershed. An important aspect of E-Fast is that it gives the user the capability to complete a self-audit. Within the pollution prevention framework, this model has the ability to save EPA and industry valuable resources.

Research Needs

Research is needed to define users for E-Fast that can use modeling to optimize environmental performance. Possible targets are trade associations within specific sectors that are conversant with industry problems and can recommend E-Fast.

Graphical Exposure Modeling System (GEMS)

GEMS is a higher-tier software statistical tool used for sector-based environmental protection. Using GEMS, the framework of a particular industry can be strategically matched into a comprehensive package with data on population, statistics, etc. GEMS excels in its statistical capabilities. GEMS capabilities are based on a complex method of statistical computations, requiring a vast and in-depth knowledge of science and chemistry for optimum use.

Currently, an in-house version of GEMS is under construction, with an expected completion date of October 1999. A further goal is to have the model available on-line by December 1999. GEMS' features include modular design, "plug–in, plug–out capabilities," future up-grades, and GIS capability.

GEMS can be used for screening air and water simultaneously to derive both multi-site and multi-media data. The GEMS Air Dispersion module includes both short and long term capabilities and looks at multiple facets of the industry. For example, by reviewing a smokestack release, the GEMS tool can take into account the population, day, windspeed and temperature, and create a picture of a plume released out of the stack and into the environment. The Surface and Water Module is a mass balance approach with a focus on equilibrium. The Sea and Soil AT123D Module detects movement of water within the soil. It confirms which chemicals caught in the soil are likely to reach streams or other waters.

Groups with an interest in GEMS include the EPA and other Federal regulatory agencies, State and local governments, graduate students, environmental groups, community members, scientists and consulting firms. Companies might also find the kind of data GEMS provides useful in their work.

Research Needs

An increase in the amount of data collected and validated in real world testing would increase the applicability of GEMS to SBEP. Collecting information about the movement of water in soils, dispersion of compounds in air, and the multi-media effects of releases moving from soil to water, for example, would mean that every module included in GEMS would contain validated, sector-specific data.

<u>Source Ranking Database (SRD)</u>

The SRD hazard-ranking tool has been compared to the UCSS method. SRD is used to rank hazards to facilitate informed decisions about what pollution problems are in need of the most attention within a given industry. Industries are defined using the SIC hierarchy classification systems. Substances ranked include specific chemicals used in and around the home and office. The indoor environments considered within this database range from cars to public access buildings, such as a mall.

SRD contains a database of hazard information on over 12,000 products representing 1,400 chemicals. The data used are replicated from product formulation data and emission rates. They includes usage rates and market surveys, as well as professional judgment and Census Bureau statistics. The chemicals in the database have been assigned either a high, medium or low toxicity rank. Information about chemicals' molecular weight and vapor are also included.

SRD also ranks substances in terms of their "source," which includes both consumer and commercial use of products. Source, in terms of SRD hazard ranking, is defined as all possible points at which the chemicals making up a given product can enter the environment. SRD allows the user to derive a chemical hazard score, which provides information about which chemicals are present in a given product, and which of its constituents present the greatest hazards. For example, volatile compounds receive a higher chemical hazard score than non-volatile compounds.

Research Needs

To further develop this tool, more reliable formulation and emission data are needed. Emission model testing dependent on product use is still quite crude. To improve this information, more emission testing is required. Most current SRD information was received from the VOC Survey conducting during the time of the Clean Air Act proposal. Updated information would reduce the uncertainties of using older data.

3.1.4 Life Cycle Analyses and Assorted P2 Tools (Glenn Shaul, NRMRL)

Glenn Shaul, from EPA's National Risk Management Research Laboratory (NRMRL) in Cincinnati, presented an introduction to the Sustainable Technology Division and an overview of the many software tools available to assist SBEP pollution prevention (P2) work. The Sustainable Technology Division is creating resources to use in sector/facility characterization. The Division's P2 efforts focus on redesigning the operations of industry so that the creation of pollution is avoided or minimized. Research in the Division is concerned with developing modeling, process simulation and other tools with potential applications that are as extensive as possible for achieving environmental objectives within single facilities.

The Division is developing analytic tools for cleaner processes and products in an "environmental improvement toolbox." The EnviroSense database is one example of a tool presenting life-cycle analysis (LCA) and P2 technical research and development information. Specific tools focus on pollutant identification and quantification; overall P2 assessment; process planning; system analysis; and product life-cycle management. As opposed to a listing of tools, breakout group participants were interested in understanding their potential uses and application in SBEP.

These tools are intended for use by both EPA and industry. EPA can use them to perform LCA and P2 analysis for SBEP. Industry can use them to move beyond compliance, through LCA, toward P2. Since private firms do not necessarily have the technical knowledge or staff to use these tools, EPA can assist them by providing expertise.

One goal of the Office of Reinvention is to develop a tools inventory so that users know which tool to use to achieve a particular end result. Appropriate tools can be identified by first considering their ultimate purpose, such as the analysis of cross–media impacts or process analysis. It was suggested by the group that EPA hold a multi-office meeting to discuss and integrate tools, as there is a concern that some duplication is occurring across offices.

3.2 Poster Walk Discussion – Tools For Sector Work

Each breakout group prepared a poster summarizing the tools they discussed and associated research needs. The entire group then reviewed each poster and prioritized issues according to the importance for development and use of analytical tools for sector work. Transcriptions of the posters for the poster walk sessions are located in Appendix D.

General discussion focused on the multitude of tools and the need for inventory, integration, and/or synthesis of the tools to make them easier to locate and use and to avoid duplication. Many software tools have been and are now being developed by EPA, but there is no central clearinghouse for the tools or any guidance describing what tool is best suited to a given situation. OR is creating a tool inventory at this time. Because the tools are being developed in disparate efforts, work also needs to be done to determine if some tools can be integrated and to determine if there is redundancy of effort. Concern was expressed about the degree of expertise needed to use the tools, especially among small businesses; EPA will be required to provide technical assistance in the use of complex tools designed for industry.

The tools identified as most useful for SBEP work are those that help analyze cross-media impacts and processes and are transferable from one media to another. Additionally, tools that yield performance-based measures are seen as superior to those that are based on pollution control analysis. Generally, the need for more research to provide more data for input into the tools was noted. Specific research needs identified for particular tools are listed below:

- Remote sensing - Uses in sensing ambient conditions.

- Environmental audit protocols – Create a virtual audit to illustrate proper audit procedures in conformance with Title 40 and ISO 14101012.

- Self-Audit for Organic Coaters – Perform additional research into pollution prevention alternatives.

- Metal Finishing Facility Risk Screening Tool – Expand to water and land and identify audience.

- Sector Profile Tool – Include capacity to update beyond TRI and other EPA databases.

In general, it is important to demonstrate and evaluate tools in a “real world” setting, integrating them with other tools and resources. To facilitate selection and use, EPA must provide staff with a user’s guide defining the applicability of each tool. User-friendly tools should be made available via the Internet. From a practical sense, EPA must state how a particular tool will help in certain types of cases. The Agency should also provide a tutorial on the use of the tool.

3.3 Experiences in Sector-Based Environmental Protection Implementation

Breakout groups in this session structured their work based on the following questions:

- What facilitated or enabled SBEP work?

- What were the obstacles encountered? (Technical, Scientific, Legal, Organizational, Political, or Informational)

- Might the project have been implemented more effectively in some other way? Why or why not?

3.3.1 Experiences in Project XL Permitting and Multimedia Rulemaking: Pulp and Paper Cluster Rule (Nancy Birnbaum, OR; Don Anderson, EAD; Glenn Shaul, ORD, served as facilitator)

Project XL

Project XL was designed to achieve better and more cost-effective public health and environmental protection by building flexibility into the regulatory process. Project XL can be explained as "good for business, good for the environment, and good for the community." The philosophy of the project is that ideas for improved compliance can come from the regulated community and a regulatory environment that allows operational flexibility enhances implementation of these ideas. The three outcomes of most importance to an XL Project are:

- Achieving superior environmental outcomes from negotiations with companies/industries

- Involving stakeholders and support companies with the goal of a better relationship between the company and the community

- Having regulated facilities articulate solutions to environmental problems. EPA can then decide if the solution can be legally accommodated

Current Project XL efforts include the Weyerhaeuser and MERCK projects. The Weyerhaeuser project focuses on air-related issues. The XL Project allowed Weyerhaeuser to make process changes not specified in their existing permits without first seeking Agency approval. As a result of these changes, EPA realized pollution control gains in both air and water and Weyerhaeuser realized cost savings of five million dollars over five years. Greatest savings accrued from reducing the time spent on recordkeeping. The state of Georgia asked Weyerhaeuser to turn in daily log reports; EPA waived that requirement and allowed the company to keep a "rolling limit," or an average of daily findings, and report only when requested. This change alone saved $176,000 in operating costs.

The MERCK project included a request to make quick process changes without prior approval from EPA. MERCK accepted pollutant specific limits, or sub-caps, which allowed them to increase VOC emissions in some cases. However, MERCK was required to stay in compliance with the overall NOx limit.

Challenges encountered by the XL Project committee were:

- The difficulty of moving across borders (state, international, media, regional borders).

- New technologies create new issues.

- Stakeholder involvement has evolved to a more sophisticated level. Stakeholders have acquired more power within the decision making process.

- Stakeholders as a group have shifted to include more community members, environmental groups, politicians, school officials, and the general public. Not only is stakeholder involvement greater in terms of the numbers of people involved, it has also shifted to include a more localized group of individuals.

The issue of operational flexibility is a large obstacle encountered throughout the XL Project. Within the realm of permitting approval, there is not much room for flexibility. The law has specific outlines, and the industry is not permitted to break the law. The XL Project does incorporate regulatory flexibility with site-specific rules, sector permit modifications, and variances in order to provide flexibility. For example, an industry is required to keep daily logs and report these findings each evening. To provide some flexibility from the large time burden, as well as the overwhelming quantity of record keeping and reporting required, industry is allowed to report a rolling limit. The industry is then required to report only when called upon to do so. Operational flexibility is always incorporated within the legal mechanisms. No facility will be allowed to go out of compliance; alternative requirements will be evaluated and incorporated in permits as appropriate.

The Project XL team observed that the length of time from project pre-proposal to implementation was an obstacle and has been researching ways to speed the process, including developing predictable stages. The phases before implementation have ranged from nine months to three years. The new goal for the whole process ranges between six and 12 months and includes initial company meetings, placing legal mechanisms, implementation, and a signed contract.

The many achievements of Project XL include 32 final project proposals, 12 signed agreements, 20 active negotiations, and 29 projects in the early development phase. None of the projects implemented has yet been terminated. Each program is evaluated on a yearly basis for developments and improvements. Projects vary between five to ten years at the expiration date, and provisions at that point include ensuring that the company will continue to remain in compliance. Each fiscal year the results of the project are measured. A company's emissions will not be increased overall. In fact, some degree of improvement is expected. There is no Federal funding to implement an XL Project. Each company or facility pays for any assistance it might need to do so.

Future goals of Project XL include provision of more operational flexibility to allow the industry to focus more on pollution prevention than pollution control. Increased stakeholder involvement has also shifted focus from an agency-specific to a more community-involved project. This partnership is positive because companies and stakeholders have substantial input into decisions. Stakeholders can then become more understanding of what the EPA has to do and feel they have had a voice in something about which they may feel strongly. Another goal of the Project is to access better quality information from the industries involved.

Project XL fits into the idea of sector-based environmental protection because all projects involve sector-based reform. Depending on the levels of similarities and differences between companies within the same sector, one case could be generalized to the industry as a whole. However, because large companies differ from small companies, Project XL has not been very successful generalizing lessons learned from large facility projects to small facilities.

Summary of Experiences in Developing Pulp and Paper Cluster Rules

In the 1980's, a study of widespread dioxin/furan contamination began to cause concern throughout the United States. Pollutant origin was unknown, but a common occurrence became evident. The areas being infiltrated with dioxin/furan were all downstream of a certain type of mill. Further screening found that pulp and paper mills were releasing the compounds through several different media including air, water, and solid waste. In response, EPA decided to initiate a comprehensive pollution prevention rule that would address the aggregate effects of releases from this sector.

The "cluster rules" emphasized multi-media issues and pollution prevention. A huge obstacle in this process involved the difficulty of uniting air, water, and solid waste pollution control into one project. Another obstacle was the cross-media aspect. Three different cultures, locations, budgets, priorities, and media were very difficult to unite in this effort. Stakeholders in this project included EPA, industry representatives, individuals from the community, the Environmental Defense Fund, and IndianTribes. Many stakeholders attempted to work together, but it was difficult to achieve agreements among groups with opposing goals.

Another serious obstacle involved time. It was estimated that this project would extend over approximately 18 months; in actuality it lasted two and a half years. The project was conducted between 1990 and 1991, but was not officially finalized and released to the public until December 1993. The intervening time was necessary to ensure that the regulation resulting from the process could be legally supported. The major trade-off in a regulatory project such as this is the time and resource commitment necessary to minimize the risk of losing during litigation. To illustrate, EPA had multiple public meetings on the topic of the pulp and paper mills to minimize its legal risk.

3.3.2 Enforcement Targeting & National Sector Analysis

This breakout group focused on the National Sector Analysis software tool with a tour facilitated by Mike Barrett of the OECA. The National Sector Analysis software tool is defined as a tool that provides the compliance rate for a particular industry. The National Sector Analysis tool will be available to EPA users on the Internet in June 1999 at: http://intranet.epa.gov/oeca/oc/eptdd/teb.

This tool provides planning-level targeting data that allows users to judge the relative importance of a sector from a compliance or pollution viewpoint. Data are based on the TRI and all data are from permitted sources. Using the tool, one can derive a structured analysis showing which sectors raise substantial concerns from a compliance and pollutant loading perspective. Users can also create scientific risk models from the TRI data.

There are several obstacles or challenges to using this tool for sector-based work. The Regions and states are not organized by sector so the TRI database must be reinterpreted to fit into a sector analysis. In addition, there are some legal issues associated with the National Sector Analysis database residing on the Internet. Industry might not want data on the Internet both to protect their competitive position and maintain a positive public perception. States may not agree that data are correct, even if they give it to EPA initially in the form of TRI data.

Further research needs include the ability to add data from non-inspected facilities to the database to create an accurate picture of a sector's compliance. These data are presently excluded. There is also a need to address other data gaps such as area source or small source data about air, water and Resource Conservation and Recovery Act (RCRA) information. Clean Air Act (CAA) emissions data are not current, and the degree of uncertainty increases with the use of old data. Additionally, the tool will need to be expanded by the addition of a multi-media module.

3.3.3 Compliance Assistance

Tracy Back of OECA facilitated this breakout session, which focused on the work of the Compliance Assistance Centers Team and a discussion of the function and evaluation of the Centers. The Internet-based Centers exist to help communicate the information people need to achieve compliance. The nine Internet-based centers which comprise the Compliance Center are:

- Printers' National Environmental Assistance Center (http://www.pneac.org)
- National Metal Finishing Resource Center (http://www.nmfrc.org)
- National Agricultural Compliance Center (http://www.epa.gov/oeca/ag)
- ChemAlliance (http://www.chemalliance.org)
- Transportation Environmental Resource Center (http://www.transource.org)
- Paints and Coatings Resource Center (http://www.paintcenter.org)
- Local Government Environmental Assistance Network (http://www.lgean.org)
- Printed Wiring Board Resource Center (http://www.pwbrc.org)
- CCAR-Greenlink (http://www.ccar-greenlink.org)

The mission of the Compliance Center is to help small business and communities identify the Federal regulations that apply to them so that they can improve compliance and learn about pollution prevention approaches to save money, resources, and better protect the environment.

The websites offer compliance information in a variety of formats. There are online experts available to answer specific questions, references for vendors and supplies, virtual operations that allow the user to click on graphics to see what regulations apply, and access to state and Federal regulations.

Thus far, the Centers are successfully performing their mission. Evaluation of the Centers is being done through website monitoring. Feedback indicates that 72% of visitors rank the compliance assistance provided as useful, one-third return weekly, and 85% visit the Centers monthly.

The major obstacle to long-term activity is funding. After an initial launch period, the Compliance Center was designed to be self-supporting by charging users for compliance services. The Centers will be dissolved if users will not pay for services. A second challenge is evaluating the impact of the Centers accurately. While site visits can be quantified, it is difficult to capture data about behavioral changes resulting from information obtained through the Center.

3.3.4 Life Cycle Management in the Automobile Sector (Keith Mason, Office of Air and Radiation)

The President's Council on Sustainable Development and the Common Sense Initiative (CSI) implemented a life cycle analysis project with General Motors. Based on the results of this project, EPA would consider taking similar approaches with other companies within the automobile sector. By participating in the project, General Motors hoped to obtain near-term regulatory flexibility. EPA sought to: (1) integrate pollution control among different media (although sector-based activities are not necessarily multi-media in nature); (2) implement an alternative regulatory system for the industry; and (3) advance pollution prevention in corporate environmental management. There was also an environmental justice goal to empower the community through technical assistance and the availability of industry information.

EPA found that regulatory flexibility is easier to achieve on a site-specific level than on a nationwide basis. For example, the Agency performed a new source review and looked at increasing the flexibility of air regulations but could not achieve consensus with stakeholders, such as environmental groups. Some stakeholders feared a precedent of regulatory dismantling or circumvention.

The complexity of a multimedia pollution control strategy limited the effort to primarily to gathering information. Without a strong driver forcing convergence among the separate offices that regulate each different pollutant, project participants felt that such multimedia projects may only occur at the level of a plant's environmental engineer. EPA found that the plant engineer would be willing to try a new experimental approach, but that the multiple stakeholders involved in the process, and their individual interests, hindered the implementation of a new initiative.

EPA also found obstacles in implementing a new regulatory approach beyond the facility level. In the absence of a legislative and/or regulatory decree to build a new regulatory system, only general agreements were possible on the industry level. This implies that the Agency must negotiate principles, processes, and practices with each facility, as well as address all of the individual challenges put forth by each facility.

The Agency was able to create a unique information resource at the intersection of Community-Based Environmental Protection (CBEP) and SBEP. Plant and community profiles, such as a Geographical Information System (GIS) database showing each automobile plant and the surrounding community, provide a model for new Agency information efforts. However, environmental organizations' desire for, and industry fear of, inter-plant comparisons is behind much of the tension associated with information-sharing efforts. Environmental justice interests want such a GIS system to show census information, environmental data, and the other companies reporting under TRI regulations that are within five miles of the automobile plants. The automotive industry would not agree to this.

The EPA team working on this project summarized the challenges from the perspectives of different stakeholders. Industry, while wishing to reduce its regulatory burden, is otherwise satisfied with the current situation and is not necessarily interested in coming up with new approaches. Competition between individual companies within the sector also presents a problem. Companies do not wish to bring their most creative ideas to EPA in front of their competitors; instead, company or site-specific initiatives (such as PAL programs) may be more effective. Environmental groups, on the other hand, are wary of regulatory experiments such as this that may set a precedent for less stringent environmental regulations. Both groups may also be feeling overwhelmed with a variety of EPA initiatives that overlap in some areas and that require stakeholder participation from regulated bodies as well as other interested parties.

EPA also experienced obstacles with regard to the life cycle analysis itself. Life cycle management involves a cooperative effort to redesign product systems to reduce environmental impacts associated with the life cycle of a given product. This involves cooperative relationships among actors in different stages of the product life cycle, such as materials suppliers, product manufacturers, and product users. Policies regarding materials and energy, manufacturing facilities, product use, and waste are involved. One of the first steps in this process is to assess the impacts throughout the life cycle of the product.

The specific life cycle analysis conducted by the President's Council on Sustainable Development was of painted car components at the General Motors Orion Assembly Plant. This involved one plant but multiple stakeholders and players. EPA created a regulatory map of all the regulations affecting the plant and conducted an energy audit for mechanisms involved in the painting process. The plant was interested in making changes so long as they could be shown to make economic, as well as environmental sense for the plant and would also result in better products. Results that could be shown in terms of concrete numbers were more acceptable than those involving more systematic changes. There are some areas, however, in which EPA intervention is not possible. In this example, EPA was interested in promoting the selection of environmentally friendly colors, but General Motors would not permit involvement in product design, only process design.

Obstacles to life cycle analysis within the context of an alternative, performance-based regulatory system in the automobile-manufacturing sector were many. In fact, the existing media-based regulations themselves proved to be an obstacle to life cycle management because they do not extend across phases of a product's life cycle, which often cross media. Addressing this issue would involve a major regulatory and legislative effort. In addition, life cycle management itself actually defies a sector approach because the life cycle involves different sectors between the manufacturer and suppliers. For the automobile industry, for example, it involves the metals, pigment, and plastics sectors, to name only a few. Life cycle management also puts the government into a product design role, where restrictions on certain chemicals already drive purchase decisions.

During the analysis, EPA found that some companies are already implementing process changes to take advantage of efficiencies. For example, Chrysler justified the purchase of a higher cost input product on the basis of the costs avoided in disposing of process wastes. However, companies within an industry often want to keep this information to themselves because it helps them to be more competitive. State standards were also found to be driving changes. For example, stricter California air emissions standards were being considered in the design of cars for all parts of the country.

EPA also encountered difficulties in establishing baseline environmental measurements. These are necessary in order to evaluate tradeoffs that can be made between different processes in different stages of the life cycle based on their costs and benefits.

Finally, it is important to consider the boundaries of EPA's role in assisting industry given the inherently differing agendas of the two groups. Industry is already looking at ways to take advantage of future cost-savings benefits. Their interest is in managing their legal liability and improving products to increase profits. On the other hand, EPA is trying to protect the environment. At times, these agendas will conflict.

3.4 Poster Walk Discussion – Experiences in SBEP Implementation

Again, each breakout group prepared a poster summarizing its discussion. The entire group reviewed the posters and discussed the SBEP implementation issues identified. Transcriptions of the posters for the poster walk sessions are located in Appendix D.

Lack of data is the primary issue for enforcement targeting and national sector analysis. Most pollution-emitting sources fall outside of the TRI due to small facility size or non-point source status. For targeting and analysis to be accurate, this data set needs to be complete and applicable to multi-media situations. Additionally, a structure needs to be established so that targeting and sector analysis information reaches enforcement personnel at state and local levels.

According to website use statistics and user surveys, EPA's Internet-based Compliance Assistance Centers are successfully performing the job of providing useful compliance information to the regulated community and other interested users. These Centers were designed to be economically self-supporting in the long-term through payments received from users. The primary obstacle to performing SBEP education through the Centers will be the lack of funding if industry is unwilling to pay for assistance.

Life cycle analysis is based on a detailed accounting of a particular process or product. This kind of analysis is project specific. While it can detail the cross-media effects of a single product, this type of analysis is not easily extrapolated to the sector level and so defies sector-based planning. Life cycle analysis is also a relatively new practice and needs further research into the effects of market-based take-back schemes and the real costs of externalities to make valid analyses for sectors.

While Project XL has had success using permitting techniques that allow some facilities operational flexibility. However, formal changes to existing permits are not receiving approval from OGC and OECA. The statutory mission of these offices is to enforce compliance according to current permits. Consequently, a key obstacle to performing SBEP for Project XL is the organizational and statutory differences in the missions and mandates of individual EPA offices.

To achieve agreement and protect against liability, the Pulp and Paper Cluster Rules were written with stakeholder collaboration. Dealing with groups with opposing agendas slowed the process. Additionally, in this atmosphere, the mills involved were not forthcoming with needed data. The main obstacle to implementing SBEP in this case was that, ultimately, time constraints resulted in the writing of vague rules.

4. Opportunities and Research Needs for Sector Work

The purpose of the SBEP workshop was to share tools and data used in sector work, to discuss scientific and technical issues related to SBEP, to identify needed research, and to create a network of interested and informed EPA staff to integrate sector approaches into their work. This plenary discussion focused on soliciting ideas about opportunities for performing sector work and identifying needed research. Issues discussed dealt with three general areas: the need for enhancing communications about SBEP, changes to the Agency's linear organizational structure, and the importance of selecting proper candidates for sector-based work.

Improving communications inside EPA, and between EPA and the states would enhance the success of performing SBEP. Currently, EPA's regional office and state environmental offices are not integrally involved in the process of redefining the Agency's work in sector-based terms. There needs to be more involvement of the states in sector work. The current communication pathway of Internet sites, for example, should be augmented with face-to-face meetings.

Suggestions for an organizational change that would enhance opportunities for SBEP included creation of an office where sector expertise could be concentrated. Experts recruited from industry would head the various sector programs and act as points of referral for any concerns arising in a sector. These sector experts would manage coordination of all the Agency resources needed to effectively deal with a given SBEP opportunity. Additionally, having one sector expert as a point of contact for industry would simplify access to now-fragmented Agency resources. This organizational change would require support from all levels of management within the Agency.

Other organizational concerns focused on the linear structure of the Agency's organization, and resource availability. While successful SBEP will require cross-media approaches, Agency offices are organized around a single-media focus. This means that gathering resources among offices might be an impediment to performing sector-based work. If there is a solid determination that the resources are available to perform sector work, then Management will have to provide leadership to transform this single media structure and connect the actual, day-to-day work being done with the SBEP goals of the Strategic Plan. If resources are limited, then EPA is better served by investing in doing its traditional work more effectively.

Addressing problems with the stakeholder negotiation framework would also improve the success of fulfilling SBEP opportunities. The CSI initiative showed that consensus cannot be too narrowly defined or nothing will be achieved. In one example, defining consensus narrowly meant that environmental protection work did not proceed if a stakeholder had any objections. Progress in performing SBEP will only occur if the stakeholder framework is inclusive but not a means by which one stakeholder is able to stop the whole process.

With regard to issues about tools and research, the Agency needs to identify appropriate, cross-sector, rule-making opportunities that will result in precedent-setting regulations and form a basis for sector-based Agency offices. A task force on coordinated rulemaking could be formed to bring expertise to this evaluation. The task force would look at potential sectors in which the Agency could coordinate rule making. Under this kind of evaluation, rules will originate from within sectors versus a process whereby rules are written then force-fit to a given sector. A demonstration of a successful, sector-based rule making would be a good starting place to gain support for further SBEP efforts.

5. Wrap Up and Next Steps

The workshop concluded with a facilitated discussion that provided all participants with the opportunity to contribute recommendations and other comments concerning potential follow-up workshops. The purpose of the entire New Directions workshop series was reiterated. It is intended to produce cross-agency linkages to strengthen science at EPA by fostering collaboration and coordination of scientific issues that cross traditional program and media boundaries.

The group observed that many issues from this workshop have had to do with organizational concerns and that several obstacles to the performance of multi-program SBEP work have been identified. Now that a variety of sector-based tools has been demonstrated, there is a need for a follow-up workshop to create a complete inventory, focus on the technical data, and identify data gaps. The group reiterated the need for increasing financial and management support for ongoing research to fill data gaps. Without valid and comprehensive data, the tools can only produce uncertain results. A second function of a follow-up workshop would be to identify areas in which these tools can be used for scientific collaborations.

On completion of the workshop series, a comprehensive report will be created for general distribution. Individual workshop discussions will be summarized in interim draft reports, such as this one, for limited internal distribution within workshop groups. Participants will follow up on any action items that resulted from discussions and ensure that their follow-up activities are incorporated into the comprehensive report. Workshop reports will be used as part of the planning process for an ORD and OR meeting scheduled for Fall 1999. Additionally, aspects of the interim reports will be considered for inclusion into the SBEP Action Plan for 2000.

APPENDICES

Appendix A – List of Participants

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Appendix B – Agenda

Workshop on

Approaches, Tools, and Research Needs for Sector-Based Environmental Protection

June 8 and 9 in Crystal City, VA

Call Pasky Pascual (202-564-2259) for more information

Workshop Objectives

- To share tools and data used in sector-based work.
- To discuss science, technical, and analytical issues and opportunities related to sector-based environmental protection (SBEP).
- To help create a network of interested, informed, and experienced EPA staff to integrate sector approaches into EPA's work.
- To identify research, technical, and other needs and opportunities related to sector work.

Day 1

8:45	Registration	
9:00	*Activity 1: Icebreaker*	Facilitator
9:10	Welcome	Kevin Teichman, ORD
9:30	Introduction	Jay Benforado, OR
9:50	**I. Problem Identification and Sector Selection**	
	• Urban Air Toxics Initiative	Barbara Driscoll, OAQPS
	• PBT Chemicals Use Reduction	Tom Murray, OPPT; Donna Perla, OSW
	• Animal Feedlot Operations	Jan Goodwin, OW; Hank Zygmunt, Reg. 3
11:00	BREAK	
11:15	*Activity 2: Problem Identification and Sector Selection*	
11:20	**II. Sector/Facility Characterization**	
	• Risk-Screening Environmental Indicators Model	Steve Hassur, Nick Bouwes, OPPT
	Sector/Facility Indexing Project	Rob Lischinsky, OECA
12:30	LUNCH	
1:30	*Activity 3: Sector/Facility Characterization*	
1:40	**III. Tools for Sector Work** (Concurrent Break-Out Sessions)	
	• Self-audit and inspection guide (CD ROM) for Organic Coating Facilities • EPA's Environmental Audit Protocols for the Chemical Manufacturing and Local Government Sectors • Sector profile tool	Anthony Raia, OECA Richard Satterfield, OECA Fred Talcott, OP Matt Lorber, ORD
	• Advanced Monitoring Technologies (Remote Sensing)	Ken Wangerud, Reg. 8 Steve Souders, OSW
	• Design for the Environment Tools	Dan Fort *et al.*
	• Life Cycle Analyses and assorted P2 tools	Glenn Shaul, ORD
2:45	BREAK	
3:00	*Poster Walk: Tools for Sector Work*	Facilitator

3:45	**IV. SBEP Action Plan**	Greg Ondich, OR
4:15	Adjourn	

Day 2

8:15	Welcome and reflections on first day	Facilitator
8:30	**V. Integrating Science into Sector Issues**	Bill Glaze, Science Advisory Board
9:00	**VI. Sector-Based Programs**	
	• Sustainable Industry Program	Bob Benson, OP
	• Design for the Environment Program	Bill Hanson, OPPT
	• Sector-Based Enforcement and Compliance Assurance Programs; Overview of National Sector Analysis	Bob Tolpa, OECA Michael Barrette, OECA
10:45	BREAK	
11:00	VII. Experiences in SBEP Implementation (Concurrent Break-Out Sessions)	
	• Experiences in Project XL permitting	Chris Knopes, OR
	• Multimedia Rulemaking: Pulp and Paper cluster rule	Don Anderson, OW
	• Enforcement Targeting & National Sector Analysis	Michael Barrette, OECA
	• Compliance Assistance	Lynn Vendinello, Terry Back,
	• Life Cycle Management in Auto Sector	Keith Mason, OAR
12:00	LUNCH	
1:00	*Poster Walk: Experiences in SBEP Implementation*	Facilitator
1:30	Opportunities and research needs for sector work	Facilitated Discussion
2:00	Wrap-up and next steps	Facilitated Discussion
2:30	Adjourn	

Common set of questions for Sections I, II, III, and VII

Sections I, II, III, and VII of the workshop consist of presentations on various EPA projects that exemplify SBEP issues. Our experience with previous workshops suggests that it would be useful to facilitate cross-project synthesis and to abstract analytical issues for each presenter to discuss a project using a common framework. Listed below are a set of questions that we hope will guide the discussion of each project.

I, Problem Identification & Sector Selection	***II. Sector/Facility Characterization***	***III. Tools for Sector Work***	***VII Experiences in SBEP Implementation***
• What were the materials of concern? • What was the extent of the problem? • Why did you choose a sectoral approach to help solve the problem?	• What is the general approach being used to characterize the facilities or sector(s)? • What analytical model(s), tools, and data were used? • What additional research would help the sector/facility characterization?	• What is the objective of the tool? • How was the tool developed? • Does it focus on a single sector or is it broadly applicable? If it focuses on a single sector, how transferable is it to other sectors? • From which data sources (if any) does the tool draw? • What additional research would improve development of the tool?	• What facilitated or enabled SBEP work? • What were the obstacles encountered? • Might the project have been implemented more effectively in some other way? Why or why not?

Appendix C. Breakout Group Flip Chart and Poster Transcriptions

Session III: Tools for Sector Work

SELF AUDIT CD FOR ORGANIC COATERS:

Objective: To provide plain language regulatory requirements applicable to 17 processes involved in organic coating operations AND to provide P2 & self audit information pertinent to these processes as well.

Focus: On the organic coating industry; however, many sectors are involved with organic coating of metal parts.

Regs: Full Text and Statutes drawn from U. of Cornell Law School Internet site

Additional research and identification of P2 alternatives would make this tool much more useful. P2 alternatives for each process should be linked to an easily updateable web site. Also – tagging audit protocols would be invaluable.

ENVIRONMENTAL AUDIT PROTOCOLS

Objective: Provide compliance assistance to regulated entities and encourage self-audits and self-disclosure of violations

Focus: Primarily chemical industry SIC 2800 and Municipal Gov't Sectors Data Source: 40 CFRs – Title 40

Challenges/Needs: Creating a virtual audit Harry Freeman to illustrate proper audit practice conformance with Title 40 and ISO 14010 - 14012

REMOTE SENSING/SMART LDAR

Objective: Screening-level site assessments/leak detection for petroleum

Research needs:

- Make transferable
- Not just refineries also air
- Move to more performance based results -cost
- Improve technology for air
- Extend spectral coverage of finger prints

- Research in H2O chemistry and plant sensing (Streams, vegetation, sensing) (Sampling and understanding ambient conditions)
- Quantify
- Capture uncertainties
- Biological issues not being factored in
- Getting good quality data to run models

LCA AND ASSORTED P2 TOOLS

- Tools
  - Systems Analysis
  - Process Simulation
  - Alternatives Assessment/Materials substitution metrics (environmental Benefit)
  - Cost-benefit (e.g. total cost account,)
  - MFFRST Metal Finishing, Facility Risk Screening Tool - Objective-“Screening” Tool use by regulators, Industry, Citizens
  - Existing models, Data, Approaches scope-single Sector, Inhalation Risks - If successful, can be transferred
  - Data Sources- IRIS, TRI, SECTOR PROFILES
  - Status, Issues-Beta test version
  - Expand to water, land?
  - Is there an audience?

Session VII: Experiences in SBEP Implementation

PULP AND PAPER CLUSTER RULES

- Time, resources to have solid record support
  - Front end work (organizational obstacle.)
  - Data gathering
- This was highly successful not an obstacle!
  - An agency benchmark.
- Extend compliance but had hammers (legal obstacle)

Obstacles:

- Different program offices
  - 3 different locations
  - 3 legal statues
  - 3 offices cultures (organizational)
- Timeline for cluster rules
  - Goal 18 months – actual 2 ½ years

- Message: Management needs to know this will take time

- Difficulty in getting data from mills (informational)
- Industry not forthcoming time pressures frustrations

ENFORCEMENT TARGETING & NATL SECTOR ANALYSIS

Obstacles:

- Scientific risk modeling can be done for TRI data converting single media data more difficult (ex. toxic models)
- Organizational regions & states not organized by sector – forced to do "matrix management"
- Legal database is on Intranet going to Internet – could be issues
  - Industry might not want data on Internet
  - States may not agree that data is correct even if they give to EPA.
- Info/data define gaps – area sources/small source data air, water &RCRA.
- Clean Air Act emissions data not current.
- Quality data entry by states and regions is huge issue (states a particular challenge)
- Outside TRI - State– eval. and local–level

COMPLIANCE ASSISTANCE CENTERS

Obstacles:

- Main obstacle is funding
- Desire that Centers would fund themselves after a period of time
- Concern that good resource will go away
- Evaluating how we're doing
- ICR issues

LCA W/IN CONTEXT OF ALT. REG. SYSTEM

Obstacles:

- Fitting LCA w/in legal/organizational stove-piped system (media based)
- Organizational/political obstacles defy sector-based in the sense that need up- and down-stream actors.

Need:

- Scientific/information resources to establish baseline environmental metrics (but need regulatory or market-based take-back schemes)
- Scientific/information resources to develop info base to make tradeoffs of environmental benefits or costs among products difficulty stages
- Scientific/information resources to "normalize" facility comparisons

- Limited info because of business competition
- Ill-defined stakeholder process

Wrap-up

(PROBLEMS/LESSONS LEARNED)

- Compliance vs noncompliance vs new sectors
  - What's the leadership
  - All or some of this
- Sectors as a way of solving environmental problems (or going beyond discussion – setting up a new sector program (use where needed))
- Your own "bean count" (rulemaking) takes precedence over "Is this worthwhile?"
- Task force on coordinated rulemakings report: we should be using sectors to coordinate a rule, were doing just the opposite (force fitting it – looking for rules)
- Focusing on outcomes, building that into project early on.

"ENVIRONMENTAL IMPROVEMENTS BILL '99"

- Better environmental performance.
- Monitoring/demo environmental perform actual results.
- Regional/State/Local level involvement (really talking to people).
- Org. change – info sharing, comm.
- "Sector guru", sectors office.
- Must come from bottom up (everyone knows about guru).
- How we make decisions – defining consensus too narrowly.
- Program MOAs must reflect emphasis on sectors.
- Need more AA – level leadership (less stovepipe behavior) - Regional perspective.

NEXT STEPS

- All will get copies of report
- Data and data quality issues
- Sector tools inventory (or)
- Institutionalize housing of info on SBEP (2000 plan)
- What's in each tool – data analysis
- Fall workshop ORD & NIO
- Integrated Approaches to Environmental Info.